

SOLAR OBSERVATIONS

SOLAR AND SKY RADIATION MEASUREMENTS DURING JULY, 1930

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For reference to descriptions of instruments and exposures, and an account of the method of obtaining and reducing the measurements, the reader is referred to this volume of the REVIEW, page 26.

Table 1 shows that solar radiation intensities averaged higher than the normal intensity for July at Washington and Madison, and close to normal at Lincoln.

Table 2 shows an excess in the total radiation received on a horizontal surface at Washington, Madison, Lincoln, and New York, and a deficiency at Chicago, Fresno, and La Jolla for the month. Through the courtesy of Dr. O. J. Sieplein, director of the Belle Isle Observatory of the University of Miami, Fla., records of the total solar and sky radiation are added to the list of similar measurements published in Table 2. The instrumental equipment in use at this station consists of a Callendar recorder, together with a Callendar receiver having a quartz hemispherical cover. The latitude of the station is 25° 45' N. and the longitude 80° 08' W. The altitude of the receiver is close to sea level.

Skylight polarization measurements obtained on four days at Washington give a mean of 51 per cent and a maximum of 60 per cent on the 8th. At Madison measurements obtained on nine days give a mean of 61 per cent with a maximum of 68 per cent on the 30th. These are close to the corresponding averages for July at both stations.

TABLE 1.—Solar radiation intensities during July, 1930

[Gram-calories per minute per square centimeter of normal surface]

Washington, D. C.

Date	Sun's zenith distance										Local mean solar time	
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°		Noon
	75th mer. time	Air mass										
		A. M.					P. M.					
		e.	5.0	4.0	3.0	2.0	1.0	2.0	3.0	4.0		5.0
	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.	
July 7	16.79				1.01						10.97	
July 8	11.81		0.90	1.05	1.15	1.36					11.81	
July 10	15.11				0.90	1.37					10.21	
July 11	13.13				0.80						14.10	
July 25	15.11			0.65	0.84	1.19					13.13	
July 28	20.57				0.77						18.59	
July 30	9.47					1.40	1.10	0.88	0.72		7.87	
Means		(0.90)	(0.82)		0.91	1.33	(1.10)	(0.88)	(0.72)			
Departures		+0.23	+0.05	+0.01	+0.15	+0.12	+0.09	+0.04				

TABLE 1.—Solar radiation intensities during July, 1930—Contd.

Madison, Wis.

Date	Sun's zenith distance											Local mean solar time
	8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon	
	75th mer. time	Air mass										
		A. M.					P. M.					
		e.	5.0	4.0	3.0	2.0	1.0	2.0	3.0	4.0	5.0	
	<i>mm.</i>	<i>cal.</i>	<i>cal.</i>	<i>cal.</i>	<i>cal.</i>	<i>cal.</i>	<i>cal.</i>	<i>cal.</i>	<i>cal.</i>	<i>cal.</i>	<i>mm.</i>	
July 2	9.14					1.27					8.48	
July 7	17.37		0.90	1.05	1.22	1.38					10.59	
July 12	11.38				0.95	1.18					18.59	
July 14	7.87	0.89	0.97	1.10	1.24						7.57	
July 15	8.18	0.73	0.85	0.99	1.12	1.36					8.18	
July 16	8.81				1.03	1.24					10.59	
July 24	13.61					1.29					13.13	
July 25	14.60				1.07	1.23					15.11	
July 28	16.78				1.10	1.33					12.24	
July 29	11.38					1.37					9.47	
July 30	10.59				1.26	1.46					9.47	
July 31	9.83				1.09						10.21	
Means		(0.81)	0.91	1.05	1.12	1.31						
Departures		+0.13	+0.13	+0.14	+0.06	+0.03						

Lincoln, Nebr.

July 1	10.21						0.96	0.84	0.67		9.14
July 5	16.20		0.68	0.84	1.06	1.29	1.04	0.86	0.65		20.67
July 10	14.60			0.85	1.02	1.19					12.08
July 11	13.13		0.73	0.89	1.08	1.27					11.81
July 14	7.87		0.88	1.01	1.17	1.41	1.15	0.87			7.57
July 15	7.57						1.00	0.78			8.81
July 16	9.83		0.78	0.91	1.07	1.32	1.02	0.78	0.64		10.59
July 17	8.48		0.79	0.91							9.83
July 19	10.59						0.97	0.81	0.67		10.59
July 31	11.38		0.75		1.06						16.79
Means		0.77	0.90	1.08	1.30	1.02	0.82	0.66			
Departures		-0.01	+0.01	+0.00	-0.02	-0.04	-0.06	-0.07			

† Extrapolated.

TABLE 2.—Total solar radiation (direct+diffuse) received on a horizontal surface

[Gram-calories per square centimeter]

Week beginning	Average daily totals										
	Washington	Madison	Lincoln	Chicago	New York	Pittsburgh	Gainesville	Twin Falls	Fresno	La Jolla	Miami
1930											
July 2	592	523	649	392	467	557	570		645	310	432
July 9	561	538	609	380	404	538	547		650	525	511
July 16	461	525	576	436	383	482	607		702	501	552
July 23	509	558	556	424	376	528	649		713	518	574
	Departures from weekly normals										
July 2	+85	-9	+65	-72	+51				-54	-176	
July 9	+74	+7	+36	-32	-3				-45	+10	
July 16	-14	+14	+5	+16	-16				+1	-11	
July 23	+29	+62	+16	+12	-20				+15	+54	
Accumulated departures on July 1	+1,631	-406	+133	+1,883	-175				-1,590	-2,261	